

Serial Number: 10/733955
Docket No.: SP02-268

Page 2

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims

1. (currently amended) A grid polarizer comprising:

a substrate; and

a plurality of stacked metal and dielectric or semiconductor layers, having a width w , disposed on the substrate and forming a parallel grid of stacked layers, the stacked layers spaced apart to form a repetition space between the stacked layers, Λ , such that no diffraction orders are allowed to propagate except the zero order resulting in a grid polarizer that is capable of transmitting substantially all illumination of a given polarization while suppressing at least a portion of the illumination reflected due to an orthogonal polarization component;

wherein the repetition space, Λ , satisfies the relation: $\Lambda < \frac{\lambda}{n_t - n_i \sin \theta}$, where λ represents

the operating wavelength of the polarizer, n_i represents the index of the incidence media, and n_t represents the index of the transmitting media.

2. (currently amended) The polarizer of claim 1, wherein the device is capable of suppressing transmitting substantially all of the illumination of a given polarization while suppressing substantially all at least of portion of the illumination reflected due to an orthogonal polarization component.
3. (original) The polarizer of claim 1, wherein the device comprises first, second and third layers.
4. (currently amended) The polarizer of claim 3, wherein the first layer comprises a metal and is adjacent the substrate, the second layer comprises a dielectric or semiconductor and is adjacent the first layer, and the third layer comprises a metal and is adjacent the second layer.

Serial Number: 10/733955
Docket No.: SP02-268

Page 3

5. (currently amended) The polarizer of claim 3 wherein the first ~~metal~~ and third ~~metal~~ layers comprise either gold or alumina and the second ~~dielectric~~ layer comprises either Si or SiO₂.
6. (currently amended) The polarizer of claim 3, wherein the thickness of the first layer is thicker than the penetration depth of the a metal comprising the first layer such that the first layer reflects substantially all incident light polarized in a direction parallel to the orientation of the grid.
7. (original) The polarizer of claim 4, wherein the thickness of the third layer has a thickness operable to allow transmission into the second layer.
8. (original) The polarizer of claim 4 wherein the thickness of the third layer is less than or equal to 100 nm.
9. (original) The polarizer of claim 5, wherein the thickness of the first layer is at least 7 times greater than the thickness of the third layer.
10. (original) The polarizer of claim 5, wherein the thickness of the first layer is at least 10 times greater than the thickness of the third layer.
11. (cancelled)
12. (original) The polarizer of claim 1 wherein the repetition space, Λ , is dependent on the intended operating wavelength of the grid polarizer and ranges from 100 to about 1000 nm.
13. (original) The polarizer of claim 7 wherein the operating wavelength is 1550 nm and the stacked layers exhibit a width ranging between about 100 to 300 nm.
14. (original) The polarizer of claim 3, wherein the operating wavelength is 1550 nm and the stacked layers exhibit a width ranging between about 100 to 300 nm.

Serial Number: 10/733955
Docket No.: SP02-268

Page 4

15. (original) The polarizer of claim 13, wherein each of the stacked layers have a substantially equal width.
16. (original) The polarizer of claim 13, wherein each of the stacked layers has a varying width.
17. (currently amended) The ~~device~~ polarizer of claim 3, further comprising ~~Fig. 9 embodiment~~ a homogenous film layer interposed between the stacked layers and the substrate.
18. (currently amended) The ~~device~~ polarizer of claim 3, wherein the substrate includes etched regions.
19. (currently amended) The device of claim ~~17~~ 18, wherein the etched regions are disposed between the stacked layers.
20. (currently amended) The device of claim ~~17~~ 18, wherein the depth of the etched regions is selected to increase the total transmission of light through the polarizer.
21. (original) The device of claim 1 wherein the transmission intensity as represented by the following equation $I_r = |E_r|^2 = \frac{(r+1-a)^2 - 4r(1-a)\sin^2 \frac{1}{2}\varphi}{(r+1)^2 - 4r\sin^2 \frac{1}{2}\varphi}$ is less than 1, wherein E_r represents the total reflected field, a represents the absorption experienced by the incident illumination upon interaction with the interface of first metal layer and the dielectric layer and r represents the reflection coefficient.
22. (original) The device of claim 21, wherein the transmission intensity is equal to 0.

Serial Number: 10/733955
Docket No.: SP02-268

Page 5

23. (new) A grid polarizer comprising:

a substrate; and

a plurality of stacked metal and semiconductor layers disposed on the substrate and forming a parallel grid of stacked layers, the grid of stacked layers having a repetition space between the stacked layers such that no diffraction orders are allowed to propagate except the zero order resulting in a grid polarizer that is capable of transmitting substantially all illumination of a given polarization while suppressing at least a portion of the illumination reflected due to an orthogonal polarization component.